last, so far) *Strepomatidæ* of the trip, *Goniobasis solidula* Lea. The bank below the water-line was covered with them. In many places little springs trickled down the bank, and in these they were to be found to a height of twelve feet above the river level. Notwithstanding the very low stage of the river, I have seen no living *Unionidæ*, and only a few worn and faded valves on Burford's Bar.

"In the the bluff at Peach Tree there is a narrow stratum of ferrugineous sand containing a few Eocene fossils. Monday, the 15th, was spent at Gregg's Landing, four miles below Peach Tree. As there were no accommodations there for staying over night, we made every minute tell. It is a fascinating spot; great masses of a hard fossiliferous sandstone in which *Turritella mortoni* and *Ostrea compressirostris* predominate, and which has come from an upper stratum seventy or eighty feet above the present water-line, lay strewn along the base of the cliff, reminding one of Potomac Creek, Va. In the lower fossiliferous stratum, of a dark, indurate, sandy clay, *Cardita planicosta*, *Cucullæa* sp., *Turritella humerosa*, *Turritella* sp. and *Calyptræphora trinodosa*, were the conspicuous ous forms.

"Bell's Landing, five miles below Gregg's, was next visited. The fossils were similar to those found at Gregg's, but among them were many rare species—rare in collections and rare at Bell's Landing.

"It was indeed singular how many uniques of some very interesting forms I found here. The stratum referred to above was also present here, but the upper one was for the most part a soft sand, and contained a greater number of species. As it was impossible to work the upper stratum in place, and as both were mixed together in the talus at the base of the cliff, I found it impracticable to keep the fossils of the two separate. I have not had time to hunt for land shells, but from appearances it seems somewhat unfavorable. On the bluffs it is extremely dry, while the lowlands are subject to overflow. To-morrow I go to work at the Claiborne fossils. Yours sincerely,

"CHAS. W. JOHNSON."

POLYGYRA (STENOTREMA) HIRSUTA ON LONG ISLAND.

BY A. H. GARDNER, FORT HAMILTON, L. I., N. Y.

In the October number of the NAUTILUS I noted a catalogue of the land shells of Long Island, N. Y., by Mr. Henry Prime, which

seems, from my own investigations, to be very accurate. I venture, however, to supplement the same with a species hitherto unrecorded amongst the annals of the mollusk fauna of Long Island, and existing in what I believe to be a very circumscribed area. Most of the species Mr. Prime records I have found in localities other than those he names, and from his more extended investigations and those of his predecessors, Messrs. Temple Prime and Sanderson Smith—ranging over nearly the entire island—I am inclined to believe that the species of which I am about to write is to be found in but one locality, the one in which it was first discovered.

During the early spring of 1891 a colony of *Stenotrema hirsuta* was accidentally discovered by my friend, the late Mr. James Armstrong, a naturalist residing in Bay Ridge, L. I.; they were found in a small patch of woods, or rather, a small thicket, laying at right angles to a good-sized wood, at what is now 13th Ave. and 74th St., Brooklyn. The situation was a good one, being shady, and the ground covered with small fragments of boulders cast there at some past time from the surrounding fields. It had been undisturbed for years, as the position of the stones testified to; the leaves of many summers had fallen, decayed, and left their remains amongst the interstices in the form of a rich, dark mould.

The surrounding woods, for there are (or were) several in this immediate vicinity, had been thoroughly searched, both by myself and Mr. Armstrong, for many previous years, with a view of collecting specimens of the land mollusca, and had yielded to active and close search examples of *Helix* (*Mesodon*) *albolabris* and *thyroides*, *Zonites arboreas* and *indentatus*, *Helicodiscus lineatus*, *Strobila labyrinthica*, *Vertigo Bollesiana* and *milium*, but never a trace of the *Triodopsis* or *Stenotrema* groups, which, moreover, had never been noticed before by either of us in Long Island. *Stenotrema hirsuta* is at all times a rare shell in this part of the country. I know but of one specimen, collected at Highbridge, N. Y. City, and have heard of a few specimens being found on Staten Island by the late Dr. Hibbard, on the palisades of New Jersey. I have found them, but even there they are exceedingly scarce.

Now in this particular locality they abounded, and a very large quantity of specimens was procured.

The question arises how or by what means were they introduced. Evidently they were not the survivors of a species that had once flourished there, as in that case at least dead shells would have

been found elsewhere near the locality. The large quantities found would point to their having been native to the place for a long period of time. Why they had not spread is not strange when their habits are considered: they are slow in movement and retiring, loving to adhere to the under side of a stone, where moisture can be procured in the hot days of summer. Surrounded by conditions favorable to their existence, they neither seek nor require change of locality.

It is easy to account for the introduction in any place of a new plant or insect. The influence of the wind will scatter spores or seed vessels over a vast area; whilst when the locomotive powers of insects are considered, both aerial and terrestrial, it needs but a new condition, generally the scarcity of food, to cause an immediate migration, bounded only by arrival at the nearest spot indicated by instinct as the place where more suitable conditions exist, necessary to the preserval of life and development. But in the case of a snail, and especially such a slow moving one as *S. hirsuta*, it is different; to such an organism transition over an extended distance would be an impossibility, that is to say, by its own natural powers.

The only theory possible to solve this question is that they were carried there either as snails or the spawn of snails by some outside influence which we can only attribute to a winged animal capable of covering an extended distance continuously; for example, a hawk or other bird of strong flight may have left the Palisades of the Hudson river with dirt adhering to its claws containing the embryo "hirsuta," and winging its way across river and land, alighted on a tree at this spot, and in the process of perching, scraped off dirt and snail spawn, which dropped amongst the stones below. And again, the bird may have swallowed the *S. hirsuta*, and as it is a globular shell and of very hard substance, it may have escaped the grinding of the stones in the œsophagus, passed through the digestive organs, and been ejected at the locality with other excrement, and there perpetuated the species.

At any rate, this appears the only agency by which the species can have been introduced, and unless the same can be distinctly refuted, it forms a theory illustrated by the present example of the diffusion of certain forms of molluscan life over a continent—an agency probably uncommon and rarely put in force by the strange workings of Mother Nature.

N. B.—This locality has been recently invaded by civilization in the form of an electric road passing near it, bringing its attendant blessings (?), houses and their inhabitants. But as yet the colony exists; I collected specimens there as lately as last September.

EASTPORT NOTES.

BY REV. HENRY W. WINKLEY.

Chiton marmoreus Fab.

A variety differing from the type in size and color occurs at Eastport. The type occurs in size as long as 1¼ inches, and even a trifle more than that. The blue variety is not over an inch, the average being about ¾ of an inch. The type has the color of the interior white at the edges of the valves, deepening to rose color. In the variety, which may be called var. *cæruleus*, the rose color gives place to a delicate light blue. The outside is robin's egg blue. Though not common, this variety seems to be established. I have found it twice, and in small numbers.

Bucinum undatum Linn.

The type is abundant at Eastport. Largest specimen, 2⅝ inches. (I have a specimen from near Old Orchard 4 inches long.) A variety (v. *plana*) occurs at Eastport and Grand Manan; size of largest specimen, 1⅝ inches, resembling the type except in size and loss of waves. In some cases the waves remain in faint form; in some cases they are absent altogether. The type form at Eastport has the waves very heavy.

Margarita undulata Say.

Type is abundant; an albino form occurs rarely; it is about one-half the size of the type.

Terebratulina septemtrionalis (young), *Menestho albula* and a few of the deep water starfishes were found at low tide in small numbers.

Astarte crebricostata—formerly common in 10 fathoms, could not be found.